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Art Unit: 1712 Docket No.: B02-31
Reply to Office Action of January 4, 2005

REMARKS

Applicant would like to thank the Examiner for extending the courtesy of an interview with Applicant's representatives, William B. Lacy and Jin Qian, on February 15, 2005. The remarks and amendments herein are in accordance with those discussed during the interview.

Claims 1-9, 12-15, 17-33, and new claims 34-36 appear in this application for the Examiner's review and consideration. Claims 1, 17, 25, and 31 have been amended to depend from claim 5. Claim 6 has been amended to correct a typographic error. Claims 15 and 30 have been amended to delete the crosslinking agents. Claims 22 and 23 have been amended to recite at least one layer. Claims 10, 11, and 16 have been cancelled.

In the Specification, the two paragraphs beginning at page 2, line 5 have been amended to correct minor editorial problems and/or typographical errors. Support for the amendment is found in the Specification at page 9, lines 17-22. No new matter has been added by these amendments and additions.

Rejection Under 35 U.S.C. § 112, Second Paragraph

Claims 5-8, 10-26, and 28-33 were rejected under 35 U.S.C. § 112, second paragraph as being indefinite. The Examiner states that the claim term "carbon-carbon initiator" recited is unclear in the absence of a clear structure or definition. Applicant respectfully disagrees.

The term "carbon-carbon initiator" is clearly defined (see Specification at page 2, lines 7-10, page 4, lines 15-25, and page 9, lines 17-27) and described in structure (see Specification at page 2, lines 15-25, page 3, lines 1-7, page 10, lines 13-26, and page 11, lines 1-19) in the present application. One of ordinary skill in the art would readily ascertain from these extensive references that the "carbon-carbon initiator" calls for a free radical initiator that is free of peroxide groups and capable of thermally decomposing into carbon-based free radicals by breaking at least one elongated carbon-carbon single bond. Furthermore, one of ordinary skill in the art would recognize that peroxides do not have elongated carbon-carbon single bonds, but rather have thermally breakable oxygen-oxygen single bonds.

Because one of ordinary skill would understand the definition and structures from the written description of the present application, the claim term "carbon-carbon initiator" is believed to be definite. However, in order to further the prosecution of this application, Applicant has amended independent claim 5 to recite the definition of "carbon-carbon initiator,"

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but without limiting, in any manner, the scope of the claim term as would have been used by itself.

The rejection under 35 U.S.C. § 112, second paragraph, is therefore believed to have been overcome. Applicants respectfully request reconsideration and withdrawal thereof.

Rejection Over Dalton In View of Aoki or Amtmann

Claims 1-14, 16, 17, 22-27, and 30-33 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Publication No. 2002/0006837 to Dalton *et al.* ("Dalton") in view of U.S. Patent No. 5,118,763 to Aoki *et al.* ("Aoki") or U.S. Patent No. 4,027,080 to Amtmann *et al.* ("Amtmann"). Dalton is generally directed to a golf ball having a center formed from a low vinyl, high molecular weight polybutadiene, a wound layer, and a polyurethane cover. Aoki is generally directed to an ultrahighly heat-resistant thermosetting polymer formed from high vinyl, low molecular weight butadiene polymer highly crosslinked at the vinyl sites. Amtmann is generally directed to crosslinking polyolefins of ethylene, propylene, and butylenes that are free of unsaturated groups.

To establish a *prima facie* case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation to modify the reference or combine the teachings. Second, there must be a reasonable expectation of success. Finally, the prior art reference (or references when combined) must teach or suggest all the claim limitations. The teaching or suggestion to make the claimed combination and the reasonable expectation of success must be found in the prior art, not in Applicant's disclosure. *In re Vaeck*, 947 F.2d 488, 493, 20 U.S.P.Q.2d 1438 (Fed. Cir. 1991).

First, there is no motivation to combine the teaching of Dalton with either Aoki or Amtmann, because these references are directed to entirely different polymers for entirely different applications. Dalton teaches a polybutadiene for forming a golf ball center or intermediate layer of high resilience and low compression/modulus, having a low vinyl content of less than 7%, a high cis content of preferably greater than 90%, and a high molecular weight of greater than 200,000 (see paragraphs [0090] and [0091]). In contrast, Aoki teaches a thermosetting polymer for aircraft bodies, automobile chassis, and electronic equipment, having a high vinyl content of 40% or more (column 2, lines 56-59), and a low molecular weight of 500 to 100,000 (column 3, lines 9-15), with at least 70% of the vinyl groups being crosslinked (column

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2, lines 60-64), while Amtmann teaches the crosslinking of homopolymers and copolymers of ethylene, propylene, and butylenes and being free of unsaturated groups (column 3, lines 11-18).

One of ordinary skill in the art would know from reading Aoki that the carbon-carbon initiators disclosed therein crosslink high vinyl, low molecular weight polybutadienes at the vinyl groups, and from reading Amtmann that the carbon-carbon initiators disclosed therein crosslink unsaturated polyolefins (not including polybutadienes). However, in the absence of Applicant's disclosure in the present application, one of ordinary skill in the art would *not* know, at the time the present application was filed, that the carbon-carbon initiators can be used to crosslink low vinyl, high cis, and high molecular weight polybutadienes, like those disclosed in Dalton. As such, one of ordinary skill in the art would have had no motivation to use the carbon-carbon initiators of Aoki to crosslink the low vinyl, high cis, high molecular weight polybutadienes of Dalton. Likewise, one of ordinary skill in the art would not be motivated to use the carbon-carbon initiators of Amtmann to crosslink the unsaturated polybutadienes of Dalton.

Aoki further teaches that the high vinyl, low molecular weight polybutadienes crosslinked by the carbon-carbon initiators, when compared to those crosslinked by peroxides, exhibit significant increases in modulus and vinyl crosslink amount (see Aoki's table). However, Dalton teaches that crosslinked polybutadienes having low modulus and high resilience are desirable and beneficial when used in golf balls (see paragraph [0091]). One of ordinary skill in the art would understand that the highly vinyl crosslinked, high vinyl, low molecular weight polybutadienes of Aoki are very poor in resilience, and the increases in vinyl crosslink amount and modulus afforded by the carbon-carbon initiators of Aoki would have been highly undesirable and detrimental to golf ball playing characteristics. Clearly, the teaching of Aoki is contradictory to that of Dalton.

Secondly, in the absence of Applicant's disclosure in the present application, one skilled in the art would not reasonably expect success in combining the teachings of the references. Aoki teaches that the carbon-carbon initiators are used to highly crosslink the vinyl groups in the high vinyl, low molecular weight polybutadienes. One of ordinary skill in the art would expect such a crosslinked polymer to have poor, if any, resilience. However, the high cis, high molecular weight polybutadienes of Dalton has very low vinyl content. Following the teachings of Aoki, one skilled in the art would not expect crosslinking in the polybutadienes of Dalton when peroxides are replaced by the carbon-carbon initiators. Amtmann teaches that the carbon-carbon

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initiators are used to crosslink saturated polyolefins. Following this teaching, one skilled in the art would not expect crosslinking in the unsaturated polybutadienes of Dalton when peroxides are replaced by the carbon-carbon initiators of Amtmann.

Thirdly, as stated in the Declaration of Peter Voorheis under 37 C.F.R. § 1.132, attached herewith in the Appendix, the cure temperature of 240°C to 320°C as taught by Aoki is unsuitable for golf ball manufacturing.

For at least the above reasons, the rejection under 35 U.S.C. § 103(a) is believed to have been overcome. Applicants respectfully request reconsideration and withdrawal thereof.

Rejection Over Higuchi In View of Aoki or Amtmann

Claims 1-13, 16, 17, and 21-33 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,267,692 to Higuchi *et al.* ("Higuchi") in view of Aoki or Amtmann. Higuchi is directed to a golf ball having a soft solid core, a soft inner cover, and a soft outer cover.

There is no motivation to combine the teaching of Higuchi with either Aoki or Amtmann, because these references are directed to entirely different polymers for entirely different applications. Higuchi teaches a soft solid golf ball core having a distortion of at least 2.7 mm under a load of 100 kg (Abstract, Fig. 1), formed preferably from a 1,4-polybutadiene having at least 40% cis-structure crosslinked by organic peroxides (column 2, lines 30-48). In contrast, Aoki teaches a very hard thermosetting polymer of a high vinyl, low molecular weight polybutadiene highly crosslinked at the vinyl groups by carbon-carbon initiators (see Aoki's table for increased modulus and bending strength), while Amtmann teaches the crosslinking of saturated polyolefins, which excludes polybutadienes.

In the absence of Applicant's disclosure in the present application, one of ordinary skill in the art, at the time the present application was filed, would *not* know from the teachings of Aoki or Amtmann that the carbon-carbon initiators can be used to crosslink high cis polybutadienes like those disclosed in Higuchi. As such, one of ordinary skill in the art would *not* be motivated to use the carbon-carbon initiators of Aoki or Amtmann to crosslink the unsaturated high cis polybutadienes of Higuchi.

Furthermore, one skilled in the art would not reasonably expect success in combining the teachings of the references. Aoki teaches that, in comparison to peroxides, carbon-carbon initiators increase modulus and bending strength in the resulting thermosetting polymer. That is,

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carbon-carbon initiators make the crosslinked polymer much harder. One of ordinary skill in the art would expect such a crosslinked polymer to have poor, if any, resilience. However, Higuchi teaches that a soft and resilient core formed from crosslinked high cis polybutadiene is desirable in golf balls. Following these teachings, one skilled in the art would have no reason to expect the polybutadienes of Higuchi to be crosslinkable by the carbon-carbon initiators of Aoki, or that a soft and resilient solid core would result from this combination. Amtmann teaches the use of carbon-carbon initiators to crosslink saturated polyolefins. Following this teaching, one skilled in the art would not expect crosslinking in the unsaturated polybutadienes of Higuchi when peroxides are replaced by the carbon-carbon initiators of Amtmann.

Additionally, as stated in the Declaration of Peter Voorheis under 37 C.F.R. § 1.132, attached herewith in the Appendix, the cure temperature of 240°C to 320°C as taught by Aoki is unsuitable for golf ball manufacturing.

For at least the above reasons, the rejection under 35 U.S.C. § 103(a) is believed to have been overcome. Applicants respectfully request reconsideration and withdrawal thereof.

Rejection Over Sullivan In View of Aoki or Amtmann

Claims 1-13, 16, 17, 22-27, and 30-33 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 6,057,403 to Sullivan *et al.* ("Sullivan") in view of Aoki or Amtmann. Sullivan is directed to a golf ball having a resilient dual core, an ionomer-based inner cover, and a soft, thermoplastic, outer cover.

There is no motivation to combine the teaching of Sullivan with either Aoki or Amtmann, because these references are directed to entirely different polymers for entirely different applications. Sullivan teaches a golf ball core that is soft (PGA compression of 90 or less) and highly resilient (coefficient of restitution of 0.750 or more), formed from an uncured or lightly cured elastomer based on a high cis polybutadiene (column 30, lines 15-22). In contrast, Aoki teaches a very hard and non-resilient thermosetting polymer of a high vinyl, low molecular weight polybutadiene highly crosslinked at the vinyl groups by carbon-carbon initiators, while Amtmann teaches the crosslinking of saturated polyolefins, which excludes polybutadienes.

In the absence of Applicant's disclosure in the present application, one of ordinary skill in the art, at the time the present application was filed, would *not* know from the teachings of Aoki or Amtmann that the carbon-carbon initiators can be used to crosslink high cis polybutadienes like those disclosed in Sullivan. As such, one of ordinary skill in the art would

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not be motivated to use the carbon-carbon initiators of Aoki or Amtmann to crosslink the unsaturated high cis polybutadienes of Sullivan.

Furthermore, one skilled in the art would not reasonably expect success in combining the teachings of the references. Aoki teaches that, in comparison to peroxides, carbon-carbon initiators highly crosslink (70% or more) high vinyl polybutadienes, and make the crosslinked polymer much harder. One of ordinary skill in the art would expect such a crosslinked polymer to have poor, if any, resilience. However, Sullivan teaches that a soft and resilient core formed from uncured (i.e., un-crosslinked) or lightly cured high cis polybutadiene is desirable in golf balls. Following these teachings, one skilled in the art would have no reason to expect the polybutadienes of Sullivan to be crosslinkable by the carbon-carbon initiators of Aoki, or that a soft and resilient solid core would result from this combination. Amtmann teaches the use of carbon-carbon initiators to crosslink saturated polyolefins. Following this teaching, one skilled in the art would not expect crosslinking in the unsaturated polybutadienes of Sullivan when peroxides are replaced by the carbon-carbon initiators of Amtmann.

Additionally, as stated in the Declaration of Peter Voorheis under 37 C.F.R. § 1.132, attached herewith in the Appendix, the cure temperature of 240°C to 320°C as taught by Aoki is unsuitable for golf ball manufacturing.

For at least the above reasons, the rejection under 35 U.S.C. § 103(a) is believed to have been overcome. Applicants respectfully request reconsideration and withdrawal thereof.

Rejection Over Harrison In View of Aoki or Amtmann

Claims 1-13, 15, 25-27, and 30 were rejected under 35 U.S.C. § 103(a) as being obvious over U.S. Patent No. 3,572,721 to Harrison *et al.* ("Harrison") in view of Aoki or Amtmann. Harrison is directed to a golf ball having a polymer blend of a rubber and a thermoplastic substantially crystalline homopolymer or copolymer.

There is no motivation to combine the teaching of Sullivan with either Aoki or Amtmann, because these references are directed to entirely different polymers for entirely different applications. Harrison teaches a golf ball formed from a cis-polybutadiene (e.g., cis-content 97%, see column 4, lines 18-19) having a molecular weight of 200,000 to 2,000,000 (column 1, line 71 to column 2, line 2). In contrast, Aoki teaches a very hard and non-resilient thermosetting polymer of a high vinyl, low molecular weight (500 to 100,000) polybutadiene highly

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crosslinked at the vinyl groups by carbon-carbon initiators, while Amtmann teaches the crosslinking of saturated polyolefins, which excludes polybutadienes.

In the absence of Applicant's disclosure in the present application, one of ordinary skill in the art, at the time the present application was filed, would *not* know from the teachings of Aoki or Amtmann that the carbon-carbon initiators can be used to crosslink high cis polybutadienes like those disclosed in Harrison. As such, one of ordinary skill in the art would *not* be motivated to use the carbon-carbon initiators of Aoki or Amtmann to crosslink the unsaturated high cis polybutadienes of Harrison.

Furthermore, one skilled in the art would not reasonably expect success in combining the teachings of the references. Aoki teaches that, in comparison to peroxides, carbon-carbon initiators highly crosslink (70% or more) high vinyl polybutadienes, and make the crosslinked polymer much harder. One of ordinary skill in the art would expect such a crosslinked polymer to have poor, if any, resilience. However, Harrison teaches a highly resilient golf ball having a peroxide-cured blend of a high molecular weight cis-polybutadiene and a thermoplastic polymer (column 2, lines 17-21). Following these teachings, one skilled in the art would have no reason to expect the cis-polybutadienes of Harrison to be crosslinkable by the carbon-carbon initiators of Aoki, or that a soft and resilient solid core would result from this combination. Amtmann teaches the use of carbon-carbon initiators to crosslink saturated polyolefins. Following this teaching, one skilled in the art would not expect crosslinking in the unsaturated polybutadienes of Harrison when peroxides are replaced by the carbon-carbon initiators of Amtmann.

Additionally, as stated in the Declaration of Peter Voorheis under 37 C.F.R. § 1.132, attached herewith in the Appendix, the cure temperature of 240°C to 320°C as taught by Aoki is unsuitable for golf ball manufacturing.

For at least the above reasons, the rejection under 35 U.S.C. § 103(a) is believed to have been overcome. Applicants respectfully request reconsideration and withdrawal thereof.

Conclusion

Based on the remarks set forth above, Applicants believe that all of the rejections have been overcome and the claims of the subject application are in condition for allowance. Should the Examiner have any further concerns or believe that a discussion with the Applicants' agent would further the prosecution of this application, the Examiner is encouraged to call the agent at the number below.

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No fee is believed to be due for this submission. Should any other required fees be due, however, please charge them to Acushnet Company Deposit Account No. 502309.

Respectfully submitted,



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